

## REMARKS

The Office Action mailed February 4, 2008, has been received and reviewed. All claim amendments and cancelations are made without prejudice or disclaimer. Claims 1, 17, 23, 27 and 29 have been amended to correct typographical and grammatical errors. Claim 4 has been amended to clarify the claim and claim 30 has been added to recite elements previously recited in claim 4. Claim 5 has been canceled and new claim 31 has been added to recite that the "water-soluble polymer is polyvinyl alcohol (PVA)," which was previously recited in claim 7. Claim 8 has been amended to recite that the "aqueous seeding solution comprises hypophosphorous acid." Support for the amendment can be found throughout the specification, for example, at paragraph 0041. No new matter has been added.

Reconsideration is respectfully requested.

### Rejections under 35 U.S.C. § 103(a):

In general it is noted that Boonekamp *et al.* is the only cited reference that discusses the use of polymer-stabilized catalyst particles, all of the other cited references discuss the use of a palladium salt. In order to establish obviousness, the Office must establish a motivation to combine Boonekamp *et al.* with one or more of the other cited references. To do this the Office Action makes a mere conclusory statement that Boonekamp *et al.* teaches "replacement for conventional palladium salt solutions for seeding for electroless plating" (page 23-24 of the Office action, see also pages 4, 5, 15, 16, and 23-24). However, Boonekamp *et al.* does not teach a person of ordinary skill in the art that polymer-stabilized catalyst particles could be used in the place of (a replacement of) a palladium salt based redox reaction.

In fact, Boonekamp *et al.* expressly warns that the "adsorption of Pd particles will be affected by the chemical nature of the surface" (page 4089, second col., last paragraph). Rather than teaching a replacement, Boonekamp *et al.* expressly warns a person of ordinary skill in the art that the surface properties of the target film are very important and that the technique's application will be limited by those surface properties.

The chemical structure and resulting surface properties of an aromatic polymer are very different from silicone. Hence, the use of polymer-stabilized catalyst particles is not a substitute for a palladium salt, since adsorption of a polymer-stabilized catalyst particle onto silicone is not going to be the same as an oxidation reaction between a palladium salt and a reduced polyimide membrane. Boonekamp *et al.* further highlight the inability to use polymer-stabilized catalyst particles as a direct replacement of a palladium salt by repeatedly discussing the "puzzling" differences in the ability to adsorb palladium onto a silicone oxide surface relative to a silicone surface (page 4094, first col., last paragraph). In sharp contrast to the unsupported conclusion put forward by the Office, Boonekamp *et al.* really teaches away from the use of the technique on a completely unrelated surface (polyimide versus silicone), but at the very least it provides objective evidence that there is no reasonable expectation of success on a surface that is chemically and physically different from a silicone surface. Hence, it would not be obvious for a person of ordinary skill in the art to use Boonekamp *et al.* to modify any of the other cited references, and there would be no reasonable expectation of success.

Claims 1, 2, 5-10, 12, 15-17, 19, 22, 27, and 29 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Doany *et al.* (US 7,033,648) in view of Boonekamp *et al.* In particular, the Office asserts that Boonekamp *et al.* teaches the "known replacement of palladium salt depositions with water stabilized palladium catalyst particles" (page 4 of the Office Action). Applicants respectfully disagree with the conclusion that Boonekamp *et al.* teaches replacement of a palladium salt with a palladium catalyst solution and that the "adsorption selectivity for the production of high-resolution metal patterns" (*see abstract*) can then be applied to a polyimide film.

Nowhere in Boonekamp *et al.* or Doany *et al.* does either reference teach or suggest the exchangeability of a palladium salt and a palladium catalyst solution, nor does either reference teach or suggest that an aromatic polymer can be exchanged for a silicone film. In fact, the physical and chemical differences between an aromatic polymer and a silicone surface film are so extensive that it is often impossible to exchange the two surface films. Furthermore, the chemistry involved with reducing a polyimide film and deposition of a metal cation ( $Pd^{2+}$ ) so as to oxidize the polyimide film and metal back to a neutral state is completely different from the chemistry involved with depositing a polymer-stabilized catalyst particle (elemental palladium). Hence, the Office cannot combine Boonekamp *et al.* and Doany *et al.* without articulating a scientifically based rational for why a palladium salt would be expected to function the same as a polymer-stabilized catalyst particle and why each would work on both a silicone surface and an aromatic polymer surface. Since the Office has not articulated such a scientifically based rational, the Office has not established a *prima facie* case of obviousness. "The Supreme Court in *KSR* noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made

explicit. The Court quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that '[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.'" MPEP § 2141(III).

Throughout Boonekamp *et al.* the authors discuss only a Si and SiO<sub>2</sub> surface, they never discuss or mention a polyimide surface. Likewise, there is no reference in Boonekamp *et al.* of a palladium salt and how a palladium salt would relate to the use of the claimed palladium catalyst solution (elemental palladium). Finally, Doany *et al.* only discusses the use of a palladium salt. Therefore, the references, either alone or in combination, do not provide a motivation for the use of polymer-stabilized catalyst particles on a polyimide surface.

More particularly, Boonekamp *et al.* expressly states that "[t]he adsorption of Pd particles will be affected by the chemical nature of the surface" (p. 4089, second column, last paragraph), and then notes that they observed a "puzzling" difference between Si and SiO<sub>2</sub> (p. 4094). The "puzzling" difference in adsorption to Si versus SiO<sub>2</sub> indicates that the art is unpredictable, and that a person of ordinary skill in the art would not have a reasonable expectation of success, even going from a silicone surface to a silicone dioxide surface. Thus, there is no motivation to apply the process of Boonekamp *et al.* to a polyimide surface, which has chemical and physical properties that are significantly different than Si.

Thus, neither Boonekamp *et al.* or Doany *et al.* provide a motivation or suggestion to combine the cited references. In fact, Boonekamp *et al.* teaches away from combining the references due to the "puzzling" difficulties found with silicone dioxide. As a result, Doany *et al.* in view of Boonekamp does not teach or suggest a treatment process for electroless plating of

an aromatic polymer using an "aqueous seeding solution comprising polymer-stabilized catalyst particles," and cannot render the claims obvious.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 3, 4, 14 and 18 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Doany *et al.* (US 7,033,648) in view of Boonekamp *et al.* and Fraenkel *et al.* Claims 3, 4, 14 and 18 are patentable for at least the same reasons as discussed for claim 1. More particularly, Fraenkel *et al.* refers to D-34, by MacDermid Inc., as the palladium containing activator. D-34 is a tin-palladium composition that utilizes a palladium salt, palladium chloride ( $PdCl_2$ ), similar to that used in Doany *et al.* (a palladium nitrate). In addition, Fraenkel *et al.* requires the use of ozone to etch the surface film, which is inapplicable to the present invention. Finally, all of the process steps discussed in Fraenkel *et al.* are directed to a completely different process, use of ozone followed by the use of a palladium salt, and cannot be applied to a completely different process without an explanation as to why and how a person of ordinary skill in the art would expect it to work in the completely different process. The mere fact that a water wash may be known in the art does not teach a person of ordinary skill in the art when to apply such a technique in different chemical processes. For example, inserting a wash at an inappropriate stage of a new reaction may remove a necessary component of a desired reaction or may alter the pH to a non-functional range. As a result, the fact that a particular process is generally known does not mean that a person of ordinary skill in the art can apply it to a new chemical reaction without undue experimentation. Fraenkel *et al.* does not supply a motivation to combine Boonekamp with either itself or Doany *et al.*, and does not provide any teaching or

suggestion as to how or why any teachings in Fraenkel *et al.* or Doany *et al.* could be applied to Boonekamp *et al.* Thus, the references, either alone or in combination, fail to teach or suggest all of the claim elements and cannot render the claims obvious.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 13 stands rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Doany *et al.* (US 7,033,648) in view of Boonekamp *et al.* and Lake *et al.* Claim 13 is patentable for at least the same reasons as discussed for claim 1. More particularly, Lake *et al.* is directed to the use of a foil clad insulating film (col. 2, line 52 to col. 3, line 37) and does not provide the teaching or suggestion absent from the other cited references. Hence, the cited references, either alone or in combination, do not render the claim obvious.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 3, 20 and 23 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Doany *et al.* (US 7,033,648) in view of Boonekamp *et al.* and Walsh. Claims 3, 20 and 23 are patentable for at least the same reasons as discussed for claim 1. More particularly, the terse reference to palladium catalysts in Walsh references a tin-palladium catalyst, which again is a palladium salt, and the palladium catalysts described in two U.S. Patents, which are both palladium salt based. Hence, Walsh, like Lake *et al.* and Fraenkel *et al.*, does not teach or suggest the use of polymer-stabilized catalyst particles in connection with an aromatic polymer. Finally, because Walsh is directed to a completely different method, it is inappropriate for the

Office to assert that a person of ordinary skill in the art would simply use a process described therein for a completely different chemical process.

Doany *et al.* in view of Boonekamp does not teach or suggest a treatment process for electroless plating an aromatic polymer using an "aqueous seeding solution comprising polymer-stabilized catalyst particles," and Walsh does not make up for this deficiency. Therefore, the cited references, either alone or in combination, cannot render the claims obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 21 stands rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Doany *et al.* (US 7,033,648) in view of Boonekamp *et al.*, Walsh and Nuzzi *et al.* Claim 21 is patentable for at least the same reasons as discussed herein. More particularly, the Office cites Nuzzi *et al.* for the premises that the reference teaches the use of laser drilling to form holes, not for any teaching regarding the use of polymer-stabilized catalyst particles (page 10 of the Office Action). Hence, Nuzzi *et al.* does not teach or suggest the use of polymer-stabilized catalyst particles in connection with an aromatic polymer, which makes it inappropriate for the Office to assert that a person of ordinary skill in the art would simply use a process described therein for a completely different chemical process. Therefore, the cited references, either alone or in combination, cannot render the claims obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 24 stands rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Doany *et al.* (US 7,033,648) in view of Boonekamp *et al.*, Walsh and Morgan. Claim 24 is patentable for at least the same reasons as discussed herein. More particularly, the Office cites Morgan for the premises that the reference teaches cleaning polyimide substrates using acetone in an ultrasonic bath (page 11 of the Office Action). Hence, it, like Lake *et al.*, Fraenkel *et al.*, Walsh, and Nuzzi *et al.* does not teach or suggest the use of elemental palladium in connection with an aromatic polymer, which makes it inappropriate for the Office to assert that a person of ordinary skill in the art would simply use a process described therein for a completely different chemical process. Therefore, the cited references, either alone or in combination, cannot render the claims obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 25 and 26 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Doany *et al.* (US 7,033,648) in view of Boonekamp *et al.*, Walsh, Morgan and Fraenkel *et al.* Claims 25 and 26 are patentable for at least the same reasons as discussed herein. Specifically, there is no motivation to combine Doany *et al.* and Boonekamp *et al.*, since the chemistries are different and Boonekamp *et al.* teaches that even minor changes in the surface film properties can have "puzzling" effects. Hence, a person of ordinary skill in the art would not have a motivation to combine the references and would not have a reasonable expectation of success if they did combine them. In addition, neither Lake *et al.*, Fraenkel *et al.*, Walsh, Nuzzi *et al.* or Morgan teach or suggest the use of polymer-stabilized catalyst particles in connection with an aromatic polymer. Therefore, the cited references, either alone or in any combination,

cannot render the claims obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 1-10, 14-19, 27 and 29 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Fraenkel *et al.* in view of Boonekamp *et al.* As previously discussed, here is no motivation to combine Fraenkel *et al.* and Boonekamp *et al.* More particularly, Fraenkel *et al.* uses palladium chloride (a palladium salt), and requires the use of ozone to etch the surface film and Boonekamp *et al.* does not teach a "known replacement of palladium salt deposition for electroless plating activation with water stabilized palladium catalyst particles" (page 15 of the Office Action). In fact, Boonekamp *et al.* actually teaches that there are significant differential effects between Si and SiO<sub>2</sub>, which are far more similar to each other than to an aromatic polymer. Therefore, there is no motivation to combine the references, and there is no reasonable expectation of success if the two methods are combined.

As a result, the cited references, either alone or in any combination, cannot render the claims obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 12 and 13 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Fraenkel *et al.* in view of Boonekamp *et al.* and Lake *et al.* None of the cited references, either alone or in combination, teach or suggest a treatment process for electroless plating an aromatic polymer using an "aqueous seeding solution comprising polymer-stabilized catalyst particles." Therefore, the cited references, either alone or in any combination, cannot

render the claims obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 20 and 23 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Fraenkel *et al.* in view of Boonekamp *et al.* and Walsh. As discussed herein, Walsh does not provide a motivation to combine Fraenkel *et al.* and Boonekamp *et al.* As a result, the reference cannot cure the defect in the initial reference pair. Therefore, the cited references, either alone or in any combination, cannot render the claims obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 21 stands rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Fraenkel *et al.* in view of Boonekamp *et al.*, Walsh and Nuzzi *et al.* As discussed herein, neither Walsh or Nuzzi *et al.* provide a motivation to combine Fraenkel *et al.* and Boonekamp *et al.* As a result, the cited references, either alone or in any combination, cannot render claim 21 obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 24-26 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Fraenkel *et al.* in view of Boonekamp *et al.*, Walsh and Morgan. As discussed herein, Morgan does not provide a motivation to combine Boonekamp *et al.* with any of the cited references. As a result, they cannot cure the defect in the initial reference pair and the cited

references, either alone or in any combination, cannot render the claims obvious.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 1-3, 5-10, 12, 14-17, 19-20, 23, 27 and 29 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Walsh in view of Boonekamp *et al.* As previously discussed, there is no motivation to combine Walsh and Boonekamp *et al.*, since the chemistries are different and Boonekamp teaches that even minor changes in the surface film properties can have "puzzling" effects. More particularly, Walsh uses palladium chloride (a palladium salt) and Boonekamp *et al.* teaches the unpredictability of the technique as observed between Si and SiO<sub>2</sub>. Therefore, there is no motivation to combine the references (actually there is a teaching away), and there is no reasonable expectation of success if the two methods are combined. As a result, it would not have been obvious to a person of ordinary skill in the art at the time the invention was made to apply Boonekamp *et al.* to a completely different surface film having a significantly different surface chemistry.

Therefore, the cited references, either alone or in any combination, cannot render the claims obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 4 and 18 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Walsh in view of Boonekamp *et al.* and Fraenkel *et al.* As discussed herein, Fraenkel *et al.* does not provide a motivation to combine Boonekamp *et al.* with any other cited reference. Therefore, none of the cited references, either alone or in combination, teach or suggest a

treatment process for electroless plating an aromatic polymer using an "aqueous seeding solution comprising polymer-stabilized catalyst particles" and cannot render the claims obvious.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 13 stands rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Walsh in view of Boonekamp *et al.* and Lake *et al.* As discussed herein, neither Walsh or Lake *et al.* provide a motivation to combine Boonekamp *et al.* with any of the cited references. As a result, the cited references, either alone or in any combination, cannot render claim 21 obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 21 stands rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Walst in view of Boonekamp *et al.* and Nuzzi *et al.* As discussed herein, neither Walsh or Nuzzi *et al.* provide a motivation to combine Boonekamp *et al.* with any of the cited references. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 24 stands rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Walsh in view of Boonekamp *et al.* and Morgan. As discussed herein, neither Walsh or Morgan provide a motivation to combine Boonekamp *et al.* As a result, there is simply no motivation to combine the references given the teaching away in Boonekamp *et al.* and the differences in the chemical properties between a silicone surface and a polyimide surface. Thus, the references,

either alone or in combination, do not render claim 24 obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 25 and 26 stand rejected as assertedly being unpatentable under 35 U.S.C. § 103(a) over Walsh in view of Boonekamp *et al.*, Morgan and Fraenkel *et al.* As discussed herein, Walsh, Morgan and/or Fraenkel *et al.* do not provide a motivation to combine Boonekamp *et al.* Therefore, none of the cited references, either alone or in combination, teach or suggest a treatment process for electroless plating an aromatic polymer using an "aqueous seeding solution comprising polymer-stabilized catalyst particles" and cannot render the claims obvious. Reconsideration and withdrawal of the rejection are respectfully requested.

## CONCLUSION

Claims 1-30 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, the Examiner is respectfully invited to contact Applicants' undersigned attorney.

The Commissioner is hereby authorized to charge any additional fee or to credit any overpayment in connection with this Amendment to Deposit Account No. 50-0881.

Respectfully submitted,



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